Multiple sclerosis – classification, epidemiology and etiology

(Stwardnienie rozsiane – klasyfikacja, epidemiologia i etiologia)

K Czerwińska-Mazur [1,A,D], M Kulesa-Mrowiecka [1,F], Z Kopański [1,C,E], J Tabak [2,B,C], M Mazurek [2,B]

Abstract – The authors characterized the clinical forms of multiple sclerosis, discussed selected issues from epidemiology of the disease in the world, Europe and Poland. They drew attention to the importance of sex and age in the development of multiple sclerosis, stressing that the disease most often affects people aged 20-40, which is the period of the greatest professional activity. The etiology of the disease is also discussed, with emphasis on the fact that it is caused by many factors, including autoimmune, environmental and genetic factors.

Key words **-** multiple sclerosis, classification, epidemiology, etiology.

Streszczenie – Autorzy scharakteryzowali postacie kliniczne stwardnienia rozsianego, omówili wybrane zagadnienia z epidemiologii choroby w skali świata, Europy a także Polski. Zwrócili uwagę na znaczenie płci i wieku w rozwoju stwardnienia rozsianego, podkreślając, że choroba najczęściej dotyczy osób w wieku 20-40 lat, a więc w okresie największej aktywności zawodowej. Omówiono także etiologię choroby wskazując, że powstaje ona pod wpływem wielu czynników, w tym autoimmunologicznych, środowiskowych, genetycznych.

Słowa kluczowe – stwardnienie rozsiane , klasyfikacja, epidemiologia, etiologia.

Author Affiliations:

1. Faculty of Health Sciences, Collegium Medicum, Jagiellonian University
2. Collegium Masoviense – College of Health Sciences, Żyrardów

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A. The idea and the planning of the study
B. Gathering and listing data
C. The data analysis and interpretation
D. Writing the article
E. Critical review of the article
F. Final approval of the article

Correspondence to:

Prof. Zbigniew Kopański MD PhD, Faculty of Health Sciences, Collegium Medicum, Jagiellonian University, Piotra Michałowskiego 12 Str., PL- 31-126 Kraków, Poland, e-mail: zkopanski@o2.pl

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I. INTRODUCTION

Multiple sclerosis (MS), as a neurological, multiphase and progressive disease, has been known since the mid-sixteenth century. The case of the disease was described for the first time in the second half of the nineteenth century (1868). During the autopsy, small, hardened scars were found in the brain and in the spinal cord. It was the first recognition of multiple sclerosis as a separate disease entity. According to the aforementioned, MS has been identified and classified as sclerosis multiplex. In Poland, the disease was diagnosed only after the First World War [1,2,3].

The MS disease, with its long-term process and progressive decline, is contributing to lowering the quality of life. For centuries, philosophers have been trying to discover the most important goals of an individual, whose implementation was supposed to lead to a satisfying life. The beginnings of interest in quality of life date back to ancient times, when thinkers such as Aristotle or Hippocrates tried to find out what constitutes the foundation of a happy and satisfying life. For Hippocrates, a happy life is concretised

as a state of internal balance. For Aristotle, however, the highest goal to achieve was striving for the greatest good that would bring happiness. The concept of happiness means not only the objective state, but also the subjective feelings of the patient [4]. According to the World Health Organization, the concept of quality of life is defined as 'an individual way of perceiving an individual's position in a cultural context and the system of values in which he lives, and in relation to tasks, expectations and standards determined by environmental conditions'. What is more, we can add social roles, group functioning, adaptability and psychological well-being to the exponents of the quality of life [5,6].

I. MULTIPLE SCLEROSIS AND CLASSIFICATIONS

Multiple sclerosis is one of the most common diseases of the central nervous system. This is an autoimmune disease with inflammatory-demyelinating foundation. MS is a demyelinating disease of the nervous system, in the course of which multifocal damage to the nervous tissue occurs. As a result of pathomechanisms, multifocal damage to the structures of the central nervous system (CNS) [1] arises. As the name suggests, the disease process favors the emergence of scattered foci, which in turn leads to numerous clinical symptoms [7]. The consequence of the disease process is a scattered CNS damage and occupation of periventricular structures, subcortical structures of the white matter of the hemisphere, brain stem, cerebellum and spinal cord. It is characterized by a variable, progressive and specific course. It systematically leads to deterioration of the patient's physical condition and leads to permanent disability [2]. The emergence of a chronic disease such as multiple sclerosis contributes to a significant disruption of current life. The disease process gradually weakens and limits the patient leading to physical and mental disability [2,3].

As a consequence, MS affects the cognitive sphere, causing its disorder. It is difficult to predict the course of the disease itself, as it is individual depending on the patient. However, it may be helpful to know about the type of MS that the patient is suffering from. According to the classification of Lublin and Reinhold, clinical types of multiple sclerosis may be distinguished [1,2,8].

The first type of MS is a relapsing remitting form in which there are key features of the disease and a complete or partial return of functions that have been impaired. This type affects about 90% of all patients at the beginning of the course of the disease. Unexpected symptoms of damage to the nervous system are indicated. The notion of a relapse is understood as the occurrence of new symptoms or intensification of objective, neurological focal symptoms, duration of which is not shorter than 24h. Relapses can be mild, for example, numbness of a specific area of the skin, or those that the person does not even know about. Relapses can also be sharper, for example, paresis of one limb. The intensification of harsher or milder symptoms persists at a stable level (plateau phase) up to several weeks. Typical symptoms of the attack are: ataxia, sphincter dysfunctions, sensory disturbances and spastic paresis. These symptoms may withdraw or partly remain. The relapses are interlaced with periods of relative stability which lasts for months and years, and its course may vary in each patient. The frequency of relapses varies with the progression of the disease. It is estimated that the highest attack rate is in the first and second year of the disease, and then it gradually decreases. [1,2,7,9,10]

Another type is secondary progressive, which affects about 80% of people struggling with relapsing-remitting type. The secondary progressive form appears after years of the disease and is a progression after the relapse and remission period. This type can appear at any moment in the patient's life. It is the most common variant in the later stages of the disease and leads to the greatest disability. After a period of many years, neurological symptoms add up to the progressive and irreversible disability of the patient. The primary progressive form reveals lesions from the beginning. This applies to people with late onset of the disease in case of which remission and even partial withdrawal of symptoms is not noticed. Degeneration occurs gradually without clear exacerbations. [1,2,7,9-11]

Another type is the progressive relapsing type. This is the rarest form of MS, it is distinguished by progressive deterioration with episodes of exacerbations. It has also been mentioned about so-called pseudo-relapses or pseudo-attacks, which are transitory and reversible neurological symptoms. Usually these are the symptoms that occurred in the projection of previous exacerbations and have been withdrawn. They may appear in the further parts of the course of the disease under the influence of external factors, such as a higher temperature in the form of bath, heat, or infection. They usually appear in the form of patients' complaints about pain, reduced activity, physical exhaustion or cognitive decline. The diagnosis of pseudo-relapses is important from the clinical point of view, because such patients should not be treated with steroids. [1,2,7,9-11]

III. EPIDEMIOLOGY AND ETIOLOGY

SM in the world

The characteristic part of the disease is its geographic distribution. An uneven occurrence of multiple sclerosis in various geographical regions is assumed. MS occurs mainly in the temperate zone, and the incidence of disease increases with increasing latitude. This applies to the northern and southern hemisphere. For example, the number of cases of MS in the countries of the Mediterranean region, e.g. France, Spain, Italy equals about 50 patients per100,000 inhabitants, while in Northern Europe, e.g. Great Britain, it reaches 100-112 per 100,000 inhabitants, up to Scotland (Aberdeen) 144 per 100,000 inhabitants. Today, it is emphasized that the differential diagnosis of MS in regions at the same latitude, e.g. 44 ° north latitude, in Akés (France), there are 9 cases per 100,000 inhabitants, in Copparo (Sardinia) - 31 cases per 100,000 inhabitants, in Minnesota (USA) - 122 cases per 100,000 inhabitants. [12-15]

SM in Poland

Our country belongs to the high risk zone with a morbidity of 40-80 per 100,000 inhabitants, where the average rate in Europe equals 4.3 cases per 100,000 people.

In Poland, over 45 thousand people suffer from MS, while over 2.5 million people affected by the disease are estimated worldwide. The average incidence rate is 2.5 per 100,000 people per year. In Poland, there are around 2 cases of illness per 100,000 people per year. [2,3,16-18].

Sex and age

The disease affects almost twice as much women than men. There is no predilection for sex in the primary progressive form. The disease is rare for people over 50 years old (about 10% of all cases), as well as for children under 16 years of age. If the disease develops in a child under the age of 16, it is referred to as a pediatric form of multiple sclerosis, whereas in a person over 50 – a late form of multiple sclerosis. Most often, the disease affects people aged 20-40, that is in the period of the highest professional activity. [12,13,14,15,19-22]

Etiology

Outlined epidemiological differences may be related to the ethnic origin of the studied population, but also to external factors. This may be indicated by research conducted by emigrants in Israel and South Africa. They showed that people emigrating from the 'high risk' zones to the 'low risk' zones maintain an increased risk of becoming ill when they emigrate in adulthood, whereas if emigration occurs at a younger age, immigrants are subject to the risk characteristic for the country they came to, thereby less risk of getting sick. While adults emigrating from the country of a 'low risk of disease' to a country with a 'high risk of disease' they still have a low risk of falling ill, while children with this direction of emigration are at a high risk of developing MS. Multiple sclerosis is not an inherited disease and does not occur from generation to generation. These observations indicate that the genetic factor is of great importance for the development of MS, however, the development of the disease also requires the participation of other factors influencing the body before the adult age [1,2]. The diet and fatty acid content may have an impact here (found in vegetable fats, acids may have a protective function against MS). The development of the disease may be favored by increased concentration of heavy metals and increased temperature that may deteriorate nerve conduction, increasing the risk of developing or exacerbating symptoms. [23-28] The peat composition of soils, the predominance of coniferous forests, poor quality of drinking water from old water installations and home wells as well as the possible adverse effects of the wood processing industry can also be important for the risk of developing the disease [16,29].

IV. REFERENCES

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